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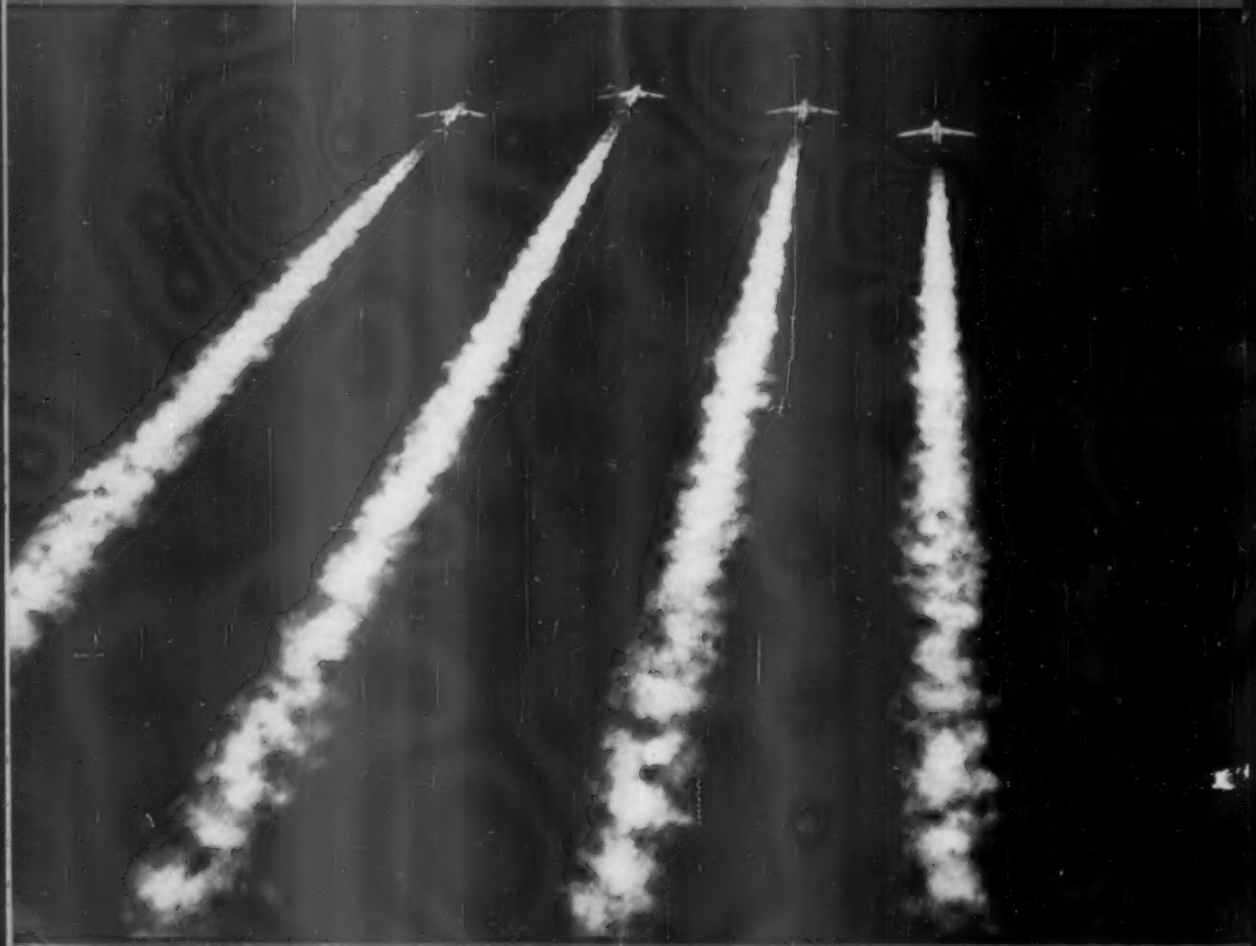
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Jet Trails

See Page 200

A SCIENCE SERVICE PUBLICATION

SCIENCE EDUCATION

To Science Teachers and Other Educators . . .

Tools of many kinds are needed by science teachers and others to nurture and increase student interest in science subjects. One such proven tool is Science News Letter. Miss Virginia Chase, science teacher at Old Trail School, Akron, Ohio, writes us how she uses Science News Letter:

Dear Mr. Davis:

I have used Science News Letter constantly during my five years of teaching since graduation from college.

It affords a pleasant break in routine when I pick up the weekly copy of Science News letter and skim it for the benefit of my classes. I orignally started using it to keep myself and my students up to date on occurrences in the world of science, and also, to stimulate the interest of the students so that they would read it, and other science material, for themselves.

To accomplish this last idea, I would skim through the magazine, reading just enough of the articles to intrigue my pupils. Then my copies would be placed on my desk to be used before or after school or class. I also asked the school libraries to subscribe, so that copies would be handy during free periods.

Within six months after I launched this plan the librarian reported that the students were checking out many heretofore practically unused science books and eventually the school subscribed to more science magazines and bought more science books to satisfy growing curiosity, stimulated by Science News Letter.

Also my students took great delight in observing that through Science News Letter they knew about a great many things before the general public did. I could not begin to count the times my students have approached me after having seen a news reel at a nearby movie theatre and would be pleased as could be because I had read to them about some development in science seen in the movie, sometimes as much as a month before in Science News Letter. Occasionally they would come across a 'scoop' in a local newspaper, an account of which we had previously read in Science News Letter. These students felt that they were on intimate terms with the world of science.

Lastly, I have found that a file of back copies of Science News Letter is very handy. I have had several students enter the National Science Talent Search or other state contests and they have frequently referred to my file. The variety of subjects which you cover is so broad that there are always many things in every issue to interest everyone.

Sincerely yours,

Virginia Chase

Old Trail School, Akron, Ohio

What has your experience been, in using Science News Letter to nurture and increase student interest in science subjects?

A letter from you would be much appreciated.

WATSON DAVIS, *Director*, SCIENCE SERVICE
1719 N Street, N. W. Washington 6, D. C.

GEOPHYSICS

Satellite To Be Twins

Burned-out hulk of rocket that speeds the satellite into its orbit will trail the moonlet and will also be a satellite, although it will be uninstrumented and will fall sooner.

➤ EARTH'S FIRST SATELLITE will very likely be twins—the instrumented 20-inch sphere and the burned-out hulk of the rocket that boosted it into its orbit.

The third stage of the three-stage vehicle lifting the earth satellite into space is expected to trail the satellite in its orbit until atmospheric drag causes both to slow down gradually and then burn up as meteors do.

This would mean, in a sense, getting two man-made moonlets for the price of one, even though the cost is estimated at more than a million dollars apiece.

Although the true satellite would carry instruments and its "twin" would not, scientists could learn much from observing both. Since the third-stage rocket would have a much higher mass than the satellite, it would spiral to earth much sooner. Comparison of the times taken by the two objects would give a higher accuracy to drag measurements than observations of a single satellite.

Milton Rosen of the Naval Research Laboratory in Washington told the Institute of Radio Engineers meeting in New York the three-stage launching vehicle will be 72 feet long, 45 inches wide at its greatest diameter, and will weigh 11 tons.

Physically, it will resemble a giant rifle shell complete with bullet. It will be finless.

The first satellite will be launched sometime after July 1, 1957, as part of the International Geophysical Year. Twelve are expected to be launched before the IGY ends on Dec. 31, 1958.

The satellite, estimated to weigh 21 and a half pounds, will carry a three-pound transmitter for radio communication with surface stations, John T. Mengel, in charge of radio tracking, told the meeting.

The first stage of the satellite's taxi to space will be a Viking-like rocket propelled by oxygen and gasoline, with tilting motors and jets for control. When the vehicle is about 36 miles up and at a 45-degree angle to the zenith, it will drop off and the second stage rocket will take over immediately. The first stage is expected to hit earth about 230 miles from the Patrick Air Force Base launching site in Florida.

The second stage contains the "brain" for the three stages. It has a cone-shaped nose section and also uses liquid propellants, nitric acid and unsymmetrical dimethyl hydrazine.

The third-stage rocket, with the satellite attached to its nose, will be carried completely enclosed within the second, which will lift the vehicle to the intended orbit, approximately 300 miles above the earth's surface, burning out at about 140 miles and coasting the rest of the way.

There, a spinning movement will be imparted to the third stage rocket to insure directional stability before the second drops off about 700 miles horizontally from the launching site.

When the third stage then fires, the satellite's path is fully determined. The third stage carries no guidance system; its only job is to boost the satellite's speed in the orbit to the approximately 25,000 feet a second needed to overcome earth's gravitational pull.

When the third stage finally separates from the satellite, they will have about the same velocity, the burned-out rocket trailing the satellite.

If the satellite circles the earth in an elliptical orbit that varies between 200 and 1,400 miles from the earth, Mr. Rosen said, the "launching vehicle will have accomplished its mission."

Dr. John Hagen, director of Project Vanguard, the name assigned to the satellite launching program, told the radio engineers the satellite could be expected to stay up for a year if it could be put into a circular orbit at 300 miles.

Since the angle and velocity of firing cannot be controlled exactly, the elliptical orbit varying from 200 to about 1,400 miles and a shorter lifetime will result.

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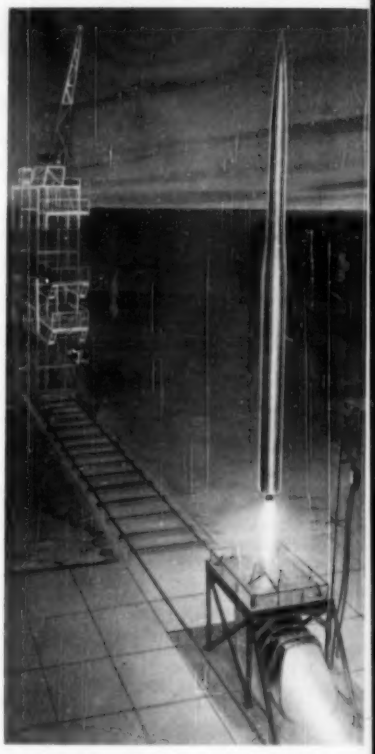

SATELLITE LAUNCHING—An artist's conception of the rocket vehicle that will lift earth's first satellite into an earth-circling path during the International Geophysical Year. In background is the gantry used to place the vehicle on its launching stand.

PHYSICS

Duplicate High Altitudes

➤ MAN-MADE SATELLITES in their earth-girdling paths will meet the very low pressures and some of the materials used by a Bureau of Standards physicist.

Dr. Herbert P. Broida reported to a University of Maryland audience on his experiments duplicating in the laboratory conditions about 50 miles up in the atmosphere, and produced the green glow given off by acetylene under such conditions.

At 50 miles, the air is so thin the sun's energy splits molecules into their atomic parts. When one wandering bit of oxygen, for instance, happens to hit another oxygen atom, the two combine and give off their excess energy as light, causing what is called "sky glow."

In Dr. Broida's experiments, solar energy is replaced by electrical energy to break up molecules into atoms at low pressures.

When oxygen atoms, produced in quantity by the electrical discharge, are mixed with nitric oxide, at very low pressures, a greenish glow is produced.

No one knows, Dr. Broida said, its actual temperature. Its measured temperature varies from many hundreds to many thousands of degrees, depending on the type of thermometer used.

The Air Force recently released nitric oxide from a rocket, then measured the intensity of light from the cloud so formed 60 miles above the desert sands at Holloman Air Development Center, New Mexico.

This experiment was similar to one last fall when a sodium cloud was made by spewing the metal out of a rising rocket. (See SNL, Oct. 22, 1955, p. 259.)

Scientists from the Air Force Cambridge Research Center have also released nitric oxide in the daytime from a rocket.

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SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

▶ **Medicina.**—Un gruppo de scientistas australian ha apparentemente trovate un solution del problema de como le droga isoniazido exerce su famose effecto benefic super tuberculose. Illo non affice le germines directemente sed solmente post combinar se con un metallo in un composito del typo cognoscite como chelatos. Le chelato de isoniazido e cupro se monstrava multo destructive pro germines tuberculotic, tanto in vitro como etiam in animales experimental. In iste forma le droga es extrememente toxic, e on suppone que in le corpore human isoniazido non se combina con cupro sed con un altere metallo que es non ancora identificate.

▶ **Physiologia.**—Dr. S. F. Cook del Universitate California ha observate dece-duo consecutive generationes de muses a un altitude de 3300 m e sex generationes in un camera a pression reducite que simulava un altitude de 5000 m. Le masculos deveniva plus o minus sterile, sed alteremente illes remaneva relativemente normal. Le femininas se degenerava plus generalmente. Illas abortava frequentemente, e le crescentia del prole esseva retardate. Post renormalisar le pression atmospheric del ambiente, Dr. Cook trovava que su muses reattingeva un quasi complete normalitate intra un sol generation.

▶ **Agronomia.**—Insectos del genere *Coccinella* es importate ab India a Florida pro assister le agri- e horticultores de ille stato nord-american in lor lucta contra aphides e altere pestes destructive de fructos e vegetales. Le specie *Brumus* ha jam provate su valor. Nunc on experimenta con *Chilomenes* que ha un duration de vita de solo septe septimanas sed que pote reproducer se rapidissimemente e que se distingue per un enorme voracitate. On ha trovate in experimentos laboratorial que un sol individuo de iste genere devorava 16.321 aphides in le curso de sex septimanas.

▶ **Medicina.**—Le alimentation via tubos que descende a transverso le esophago usque al stomacho o mesmo al intestinos es grandemente simplificate per un typo de pumpa disveloppate per Dr. J. Barron de Detroit. Le pumpa pote relentar le intubation de un litro de alimento de maniera que illo require usque a dece horas o pote accelerar le processo de maniera a completar lo in trenta minutas.

▶ **Medicina.**—Ric reservas de vitamina B-12, que es importante pro prevenir anemia, se trova in le hepate. Le analyse del contento de B-12 in le hepates de 132 mortos autopsiate ha permittite a observatores al Universitate California concluder que le hepate normal ha reservas de B-12 sufficiente pro satisfacer le requirimentos del corpore durante un periodo de tres annos.

▶ **Agronomia.**—Specialistas del statounitese Centro de Recercas Agricole ha disveloppate duo lineas de gallinas ab duo gruppos de ancestres de racia identic sed de pesos median del glandula thyroide de 32,8 e 18,2 mg, respectivemente. Per elevar le duo lineas sub identic conditiones on spera clarificar le question del influentia del thyroide super le production de carne e ovas.

▶ **Psychologia Animal.**—Chimpanzes, como infantes human, ama jocar con jochettos. Como infantes human illos prefere nove jochettos. Illos prefere jochettos ronde a jochettos angular. Illos es specialmente attrahite per colores brillante. Al etate de tres o quatro annos illos es plus interessate in jochettos que a duple iste etate.—Observationes de Dr. W. I. Welker del Laboratorios Yerkes in Florida.

▶ **Aeronautica.**—In certe typos de aviones de combatto le atterrage e etiam le partita es rendite difficilissime e mesmo periculose per le presentia de un longe e acute "naso" que protrude ante le cabina e obstrue le campo de vision del pilota. Un inventor britannic ha nunc patentate su plano de construer tal aeroplanos con un naso que le pilota pote abassar pro departir o atterrar. Durante le volo le naso es elevate in le position normal que da a iste aviones le aere de pisces gladio.

▶ **Astronautica.**—In experimentos preparatori de "medicina astronautic" on ha constatate que muses que habeva essite lanceate a altitudes de inter 35 e 40 km disveloppava un numero median de dece-un capillos blanc, in contrasto con tres capillos blanc trovate super muses de controlo sin experientia astronautic. Iste effecto debe esser le resultato del destruction o inactivation de cellulas pigmentari in le folliculos del capillos, effectuate per le impacto del radiation cosmic.

▶ **Ornithologia.**—Experimentos con columbas messageros in Sud-Carolina ha demonstrate que iste aves arriva plus securmente a lor destination si le direction de lor viage es sud-nord e non nord-sud.

▶ **Agronomia.**—Le numero de insectos que ha disveloppate racias resistente al insecticidas usate contra illos deveni alarmantemente grande. Le plus recente addition a iste lista es le brun ixode canin *(Rhipicephalus sanguineus)*. Iste peste comencia redisseminar se in New Jersey in un forma non vulnerabile per chlordano per que illo habeva essite quasi integremente eradicate.

▶ **Physiologia.**—Nostre naso non ha le function de proteger nostre respiration sed de proteger nostre senso olfactori. Iste conclusion esseva formulate per Sir Victor Negus del Hospital Middlesex in Anglaterra post que ille habeva constatate que le dimensiones del membranas de humidification nasal varia in differente animales in un correlation directe con le acutessa del senso olfactori.

▶ **Technologia.**—Le utilisation del energia solar es avantiate significativemente per un simple e incostose convertitor de lumine in calor, disveloppate per H. Tabor del Laboratorio Physic de Israel. Le apparatura consiste simplemente de un platta de cupro coperite per un strato electroplegic de nickel, zinc, e sulfidos. Le cupro obtene assi un tenuissime copertura nigre que aborbe 90 pro cento del spectro visibile e transforma lo in calor. In contrasto con altere superficies nigre, le platta de Tabor ha le utilissime qualitate que illo eradia su calor multo lentemente.

▶ **Chirurgia.**—Trompetteros e sufflatores de vitro suffre non infrequentemente de un "lesion professional" que se manifesta super toto in symptomas de marcate e persistente raucitate del voce e, in plus sever casos, de difficultate de inglutimento e attaccos de tusse. Le causa immediate de iste symptomas es un specie de hernia del larynge que apparentemente pote resultar de continue e prolongate effortios expiratori. Dr. B. J. Soboroff de Chicago, qui ha investigate iste phenomeno, considera le excision del hernia como le sol efficace therapia possibile. Ille reporta que le prime casos del syndrome unquam observate occurreva in muezzims mohammedan.

▶ **Aeronautica.**—Le statounitese Fortia Acree experimenta con specialmente construite cassas de ligno pro le ejection, sin paracadita, de merces ex aviones viagiante a alte velocitates. Le cassas tocca le terra a solmente 84 km per hora.

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GENERAL SCIENCE

Reading Interlingua

You can read Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you never had contact with any foreign language whatever.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, Science Service's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

Science News Letter, March 31, 1956

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BIOCHEMISTRY

Mother Protects Baby

➤ DISCOVERY of a hitherto unsuspected and intimate mother-baby relationship that helps protect the baby against disease was announced by Dr. Berry Campbell of the University of Minnesota School of Medicine at the meeting of the Minnesota chapter of the Society for Experimental Biology and Medicine in Minneapolis.

The new-found relationship may be the basis for the significant benefit babies get from breast feeding, especially with regard to resisting acute respiratory and intestinal diseases.

It was found as a by-product of research on a method for making dairy cows produce milk that would give immunity to diseases. That research was announced by Dr. Campbell and Dr. William E. Petersen of the Minnesota Institute of Agriculture. (See SNL, Nov. 11, 1955, p. 326.)

The breast-fed baby, as it sucks milk, apparently can infect the mother's milk-producing glands in the breast with any disease germ or virus the baby may have, Dr. Campbell now reports.

If the mother does not happen to have been infected previously with the germs, for example of sore throat or cold, her milk-producing glands will immediately start producing antibodies to fight the new germs. Then at the next feeding, or maybe next day, the baby as it nurses will get the antibodies that will fight the germs in the baby's body.

Scientists have long known that the colostrum, or first milk, the fluid secreted just before and after a baby's birth, contains whatever antibodies to disease the mother may previously have developed through having the disease herself.

The protective mechanism now announced is different in that it provides "tailor-made" protection against infection originally in the baby's body but not the mother's.

To test the theory, Drs. Campbell and Petersen experimented with cows. They let a calf suck from a cow's udder on one side, but not the other. While it was sucking, fluid containing live germs was run into the calf's mouth from a tube. The germs, *Salmonella pullorum*, cause disease in chickens but not in cows or man.

Within 24 hours, the cow was producing antibodies to the Salmonella germs on the experimental side of the udder but not on the other side. The experiment was done on four cows. Two were used in a second experiment three weeks later, after they had lost the antibodies in their udders. This time the cows produced antibodies as soon as 12 hours after getting infected during suckling, and produced much larger amounts of antibodies.

Drs. Campbell and Petersen have coined a new word to describe the phenomenon. They call it diaphelic immunization. Diaphelic, Dr. Campbell explained, means through the nipple. Associated with Drs. Campbell and Petersen in the latest experiments was Dr. M. Sarwar.

Science News Letter, March 31, 1956

• RADIO

Saturday, April 7, 1956, 2:05-2:15 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Sam Walker, vice-president of the Free Europe Committee, Crusade For Freedom, 110 W. 57th Street, New York, N. Y., will discuss "Balloons Over Europe."

TECHNOLOGY

Government Insurance For Atomic Power Danger

➤ UNCLE SAM is going to have to backstop the risk of a catastrophic disaster from blowing up of an atomic power plant.

The insurance industry is not equipped to provide liability insurance of more than about $60,000,000. Although this is much more protection than available to any other industry, it would not take care of a real atomic power disaster. The government will have to take over extraordinary risks.

These are inferences from the atomic hazards report prepared by Columbia University and released in New York by the Atomic Industrial Forum.

The report observes that, although 25 nuclear reactors have operated a total of 606,686 hours without accident imperiling the public, there is still not enough real knowledge of the risks.

The reactor industry is reluctant to proceed without more insurance than is commercially available. This imperils rapid development of atomic power.

The report urges that indemnity be provided by the government.

Science News Letter, March 31, 1956

ENTOMOLOGY

Find Missing Ant Link

➤ A MISSING LINK in the evolution of the ant has been found and identified by Harvard entomologists.

The insect, discovered in Ceylon, is expected to show scientists much about how the ant's social life has developed.

The tiny reddish-yellow ant, *Aneuretus simoni* Emery, is one of 1,000 ant species collected by Harvard entomologist Edward O. Wilson on a ten-month expedition in the southwest Pacific. Dr. Wilson brought back 100 species of ants heretofore unknown to science.

Identification of the missing link was made by Dr. William L. Brown Jr., curator of insects at Harvard's Museum of Comparative Zoology.

The missing link is a direct evolutionary connection between the most primitive and most highly developed ant subfamilies. It is a link between the big, primitive stinging ants in Australia and the garden variety backyard ant.

The small insect, an eighth of an inch long, lives in rotten wood in Ceylon's steaming rain forests. It eats other smaller insects, which it stabs with a wasp-like sting. Most other ants smear or squirt their prey with poison.

This ant has been known before from fossils in Ceylon and from a few mummified specimens, the latest of which came from Ceylon in 1912. This is the first time it has been identified as a missing link.

Another ant, believed to live in a 10,000-square-mile area of sandy plain somewhere in Australia, still remains undiscovered. The insect has inspired five expeditions within the last 20 years.

If this ant could be found, it would reveal much about the development of ants' social behavior, a field cloaked in mystery.

The species, *Nothomyrmecia macrops* Clark, is known to exist because two specimens were captured in 1934.

"If we can find it, our knowledge will be amplified immeasurably," Dr. Wilson said. "We may even be able to find out which wasp groups the ants arise from."

Science News Letter, March 31, 1956

ANT PINPOINTED—This tiny ant, found only in Ceylon, is here shown on a special pin-mount, thinner than a common pin. It is a direct evolutionary link between the most primitive and the most highly developed kinds of ants.

SOCIOLOGY

Russia as Science Leader

Marked advances in many areas of science and technology and an increasing conformity with the principles of world-wide science are seen in Russia since Stalin's death.

► RUSSIA has become a major scientific power in the ten years since the end of World War II.

Now her leaders are engaged in a "conscious and well-planned attempt" to make the Soviet Union the world's most powerful scientific nation.

Soviet science has moved in this direction since the death of Stalin.

This is the conclusion of Dr. John Turkevich, Eugene Higgins Professor of Chemistry at Princeton University, a lecturer on government and science at the Woodrow Wilson School of Public and International Affairs and a leading student of Russian affairs.

The nation's capital first had a chance to read his report when it was circulated as a private, unclassified document around the Pentagon.

It is also appearing as part of a general study of Russia since the death of Stalin in a full report in the *Annals of the American Academy of Political and Social Science*, Philadelphia.

"The last three years have seen a change in Soviet science," Dr. Turkevich states. Stalin's death unleashed what had been a philosophically isolated and hamstrung national science on the world.

"Recent years have shown marked advances in many areas of Soviet science and technology and an increasing conformity with the principles of world-wide science," Dr. Turkevich points out.

The unleashing has meant the Russian scientist has broken through or been permitted through the Iron Curtain. He has come out of his shell and isolation. Science in Russia, Dr. Turkevich explains, is no longer discussed as an expression of Communism.

It is now science itself, with its own "principles, traditions and universality."

Examples of rapid advancement in Russian science are evident in every field of scientific endeavor from astronomy to zoology. During the last two years alone the Russians have established new institutes of biophysics, nuclear problems, electronic and radio engineering, acoustics, organometallic compounds and automotive engineering. They have also set up a mathematical computer center.

The Russian leadership since Stalin has been molding, with scientific precision, the scientific potential of that country. Scientists are treated with great respect and favoritism.

The president of the USSR Academy of Sciences, for example, "occupies a position of prestige and power in the Soviet Union unlike that of any other scientist in any other country."

Keystone to the Russian effort to create a scientific army that will "blitzkrieg" its way to world leadership is the training of scientific and technological personnel.

For the Russians, as well as any other nation in the world, training scientists and engineers is what Dr. Turkevich describes as "a long-time investment."

Nevertheless, it is already evident that the Russians are graduating more trained scientific personnel in many fields than is the United States.

The Russians begin training their young for careers in science at seven years of age, when they first enter elementary school. In the primary grades, 30% of the youngsters' study is in science. In the secondary schools, it is 46% of the curriculum.

This inculcation of scientific training is beginning to pay off for the Russians. Although the United States graduates more students from colleges each year, the Soviet Union is graduating more scientific personnel.

In engineering, for example, Dr. Turkevich reports that the number of Russian graduates rose from 30,000 in 1952 to 63,000 in 1955, as compared to the United States, where the number of engineering graduates decreased in this same period from 30,000 to 23,000.

The importance of scientific training in higher education was underlined, Dr. Turkevich states, by the opening on Sept. 1, 1953, of the new building of Moscow University. In all, the University, which has been set up "solely for the training of scientists," has a complex of 27 basic buildings and 10 service buildings with a total of 1,693 laboratories, 21 auditoriums, 141 recitation rooms, 6,000 rooms for living quarters, a library of 1,200,000 volumes and a faculty of 2,300.

Another important feature of Russian scientific development is the dissemination of scientific information. Long isolated from world science, Dr. Turkevich explains, the Russians carefully and methodically translate and distribute foreign scientific journals and information.

Two years ago, he reports, the Academy of Sciences decided to publish an abstract journal called Referaty, "which will cover all fields of science."

This journal "may be the most ambitious and comprehensive scheme in existence for extracting the essence of scientific results (both Russian and foreign), sorting it according to subject, and making an index to the information so obtained," Dr. Turkevich states.

"As the world moves into the nuclear age," Dr. Turkevich concludes, "it should be apparent to all who consider the Soviet scene that Soviet science represents a tremendous potential for scientific and technological progress, that some of this potential has been translated into success and that the Soviet leadership is making a conscious, well-planned attempt to assume the scientific leadership of the world."

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ASTRONOMY

Meteor Probe by Radar

► AN EXHAUSTIVE SEARCH to catch invisible meteors by radar beams will be launched by Harvard College Observatory and Massachusetts Institute of Technology's Lincoln Laboratory.

A 1,000,000-watt transmitter and six receiving stations will be set up in southern Massachusetts to detect the meteors, "shooting stars" 500 time fainter than the flashes seen by the naked eye.

Three Harvard Observatory astronomers outlined the sky-probing plans at the American Astronomical Society meeting in Columbus, Ohio.

To obtain a direct measure of the length of the electron trail a meteor produces as it shoots through the atmosphere, the Harvard equipment will bounce radar pulses off the ionized trail at six different points. Receiving antennas, tuned to a 30 megacycle frequency and each covering an acre of ground, will catch any returned echoes. These "slave" stations will relay the echoes back to the transmitter by microwave radio.

From the time delays and shapes of the echoes, meteor velocities and orbits can be determined.

Because the meteor's velocity at six different points will be known, the amount of atmospheric drag can be measured.

Hourly calibration of the "slave" stations will allow calculation of the number of electrons at each reflection point from the echo strength. Thus, the ionization curves of individual meteors will become known, aiding in a study of the contribution of meteors to the ionosphere's electron content and to the forward propagation of radio signals.

The program will continue during the International Geophysical Year, which starts July 1, 1957, and continues through Dec. 31, 1958. Dr. Fred L. Whipple, director of the Smithsonian Astrophysical Observatory, and Drs. Gerald S. Hawkins and Curtis L. Hemenway reported the plans to the meeting.

Science News Letter, March 31, 1956

ALL OF BIRDS—Examining the new Hall of Birds at the Smithsonian nstitution in Washington are Star Bales and Jeffrey Robinson of Alexandria, a. Opened formally on March 22, the hall features ten habitat groups owing typical activities of such birds as the Antarctic penguin and the frican honey guide. Birds characteristic of nine major geographical areas are also displayed.

ENERAL SCIENCE

Future Russian Scientists

RUSSIA faces a scientific manpower ortage in 1970.

The United States, on the other hand, ay be enjoying a surplus of scientific anpower by 1970.

Evidence for the fact that in 15 years the anpower shortage shoe may be on the her foot can be found in the number of ipils enrolled for primary education in th nations.

Russian enrollment since 1950 has sagged. . S. enrollment since 1950 has increased.

Ironically, where the bumper crop of nerican school children has caused serious oblems for more qualified teachers and ore classrooms, the situation in Russia pears to be reversed.

That Russia is heading for a manpower ortage is a delayed result of the Second orld War. Experts here estimate that, ring the five war years from 1941 to 45, Russia had a birth deficit of 8,000,000. Thus, by 1970 when these 8,000,000 babies uld have reached college age, they simply ll not be around.

By 1970, there will be more students in U. S. of college age than at any previous ne in the nation's history.

There were 22,225,000 pupils enrolled in grades kindergarten through eighth in the United States in 1950. In grades one through 10 in Russia in 1950, there were approximately 33,000,000 students.

Last fall, however, U. S. enrollment for kindergarten through eighth grade jumped to 27,738,000, while Russian enrollment for grades one through 10 decreased to about 28,500,000.

Although this sag in the number of students available for training as scientists and technologists will be temporary, it can hurt the Soviet Union's master plan for becoming the world's largest producer of scientists and technologists.

The Russians have tried to stop-gap the impending shortage by introducing a compulsory seven-year educational system throughout the entire nation shortly after the Second World War. This will soon be stepped up to a compulsory ten years.

This year, 1956, has already seen the first signs of a check in the increased enrollment of Russian children. By 1958, the rapid increase following World War II will have been brought almost to a standstill.

Science News Letter, March 31, 1956

BIOCHEMISTRY

Make Virus Hybrid For the First Time

➤ A VIRUS HYBRID has been produced for the first time by crossing viruses.

Better ways to produce immunity to diseases in 10 to 20 years, as a result of this achievement, are foreseen by Dr. Wendell Stanley, director of the University of California's virus laboratory.

The active hybrid viruses result from research by Dr. Heinz Fraenkel-Conrat. He crossed protein and nucleic acids from different strains of tobacco mosaic virus to form the active hybrid viruses.

Dr. Fraenkel-Conrat found that the infective part of a virus is in the nucleic acid, the part that immunizes in the protein.

This discovery, Dr. Stanley reported, may lead to synthesis of polypeptides to produce immunity in diseases where reproduction of the virus is not necessary.

When reproduction of the virus is required, proteins from the virulent strain and nucleic acids from the harmless strain may be used to get a reproducing hybrid that will immunize without infecting.

The protein Dr. Fraenkel-Conrat used in his studies was from the common tobacco mosaic virus and masked strain, while the nucleic acid was from these as well as from yellow acuba and Holmes ribgrass strain.

Five of six possible combinations Dr. Fraenkel-Conrat tried produced on tobacco plants the symptoms characteristic only of the strain supplying the nucleic acid part of the hybrid. The research is seen as a step toward producing better hybrid viruses that may give immunity to a disease without giving the disease.

Last year Drs. Fraenkel-Conrat and Robley Williams reconstituted a virus, taking it apart into inert proteins and nucleic acid components, then putting them together again. (See SNL, Nov. 12, 1955, p. 310.)

Science News Letter, March 31, 1956

ASTRONOMY

New Faint Comet Spotted in Sky

➤ A FAINT COMET, the third to be discovered this year, has been spotted in the sky by Dr. C. A. Wirtanen, an astronomer at the University of California's Lick Observatory, Mt. Hamilton, Calif.

The comet appears as a hazy spot of magnitude 15, much too faint to be seen without a large telescope. It is in the constellation of Hydra, the water monster, visible just above the southern horizon, and is moving slowly northwest.

Its trail was spotted March 17 on photographic plates exposed March 16 as part of the long-range sky mapping program to determine the Milky Way's rotation.

When discovered, the comet's position was right ascension, 11 hours, 47.5 minutes; declination, minus 30 degrees, 49 minutes.

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TECHNOLOGY

Valuable Ashes Improve Concrete

➤ INDUSTRIAL FLY ASH from modern power stations is being mixed with cement just as volcanic ash was mixed by ancient Romans with their naturally occurring cement-forming rock.

Both kinds of ash increase the strength of the resulting concrete by combining with left-over lime.

Problems of marketing such ashes from Chicago power stations of the Commonwealth Edison Company were outlined at the American Power Conference in Chicago by Robert B. Freston of Commonwealth Edison.

Fly ash is composed of microscopic spheres of a siliceous material which results from burning coal. It is nearly white in color, and so light in weight that it flies up the smokestack unless halted by electrical precipitation devices used to control smoke and fumes.

Occurring in the same furnaces, another type of ash collected in the form of hard, glassy black slag is now being studied for as useful a market as fly ash, Mr. Freston stated. Over half a million tons of this slag are expected to be produced in 1956, compared with about 200,000 tons of fly ash, by this Chicago company alone.

Storage and handling costs must be kept low to assure economical disposal of this commonly wasted material, but experiments are under way to use the slag as a paving base material.

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MEDICINE

Find How Drugs Build Up Addiction

➤ PROFOUND CHANGES in the body chemistry, which explain tolerance to narcotic drugs, have been discovered for the first time.

The findings may explain why narcotic drug addicts have to take more and more of the drugs in order to get the desired kick, or why patients with very serious and painful illnesses may need larger and larger doses of the narcotic to relieve their pain.

They are part of studies of drugs and their effects on different animals being conducted at the U. S. Public Health Service's National Institute of Mental Health at Bethesda, Md., reported by Dr. Julius Axelrod, chief of the section on pharmacology at the Clinical Center.

The drugs under study are morphine, methadon and meperidine. These three are alike in being the most effective drugs we have for relief of pain and also for causing addiction.

They are alike in the way the body handles them. A catalyst or an enzyme in the liver attacks all three of them in the same way, removing a methyl group from the drug and transforming it into formaldehyde. This causes a change in the three drugs. The action of these drugs is antagonized by another drug called N-allyl-normorphine.

This morphine compound not only antagonizes the effects of the three narcotic drugs, but also prevents the action of the liver catalysts or enzymes. As an animal becomes tolerant to morphine and these drugs, so that more and more is needed to produce the same effect, so that more and more is needed to produce the same effect, the activity of this enzyme in the liver has been reduced.

It is apparently the reduction in this enzyme activity that brings on tolerance to the drug. There is also a constant interaction between narcotic drugs and the part of the body called the receptor upon which the drug acts as a key fits into a lock.

As this interaction goes on there is less and less of the receptor, or one might say, fewer and fewer locks for the drug to fit. Consequently more and more of the drug must be given to obtain the effect.

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SURGERY

Strain Brings Hernia on Necks of Trumpeters

➤ TRUMPETERS and glass-blowers sometimes strain their throats so much that a hernia-like swelling comes out on the neck, Dr. Burton J. Soboroff of the University of Illinois College of Medicine, Chicago, told members of the International College of Surgeons at a sectional meeting in White Sulphur Springs, W. Va.

The swelling is probably produced by an out-pouching or herniation of part of the lining of the voice box, or larynx. It may cause severe symptoms of marked and persistent hoarseness, some difficulty in swallowing, bouts of coughing and obstruction to breathing.

The condition, first noted in Mohammedans calling others to prayer, can be cured by surgical removal of the herniated sac. Voice and airway are then restored, Dr. Soboroff reported.

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AERONAUTICS

Jet Vapor Trails Over Scotland

See Front Cover

➤ LED BY a U. S. Air Force officer, modern British supersonic jets, the Hawker Hunters, leave vapor trails eight miles up over Scotland, as shown on the cover of this week's SCIENCE NEWS LETTER.

Major Ray O. Roberts of Savannah, Ga., an officer serving in Britain under the U. S. Air Force-Royal Air Force exchange program, has been put in command of Squadron 43 at the RAF Station, Leuchars, Fife, Scotland. The squadron is equipped with Hawker Hunters.

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IN SCIEN

PUBLIC HEALTH

Cancer Cure Rate Triples in Ten Years

➤ CANCER is now being cured at more than three times the rate of a decade ago, Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, told the American Academy of General Practice meeting in Washington.

"Through early diagnosis and adequate radiological and surgical therapy, the rate of cure in all cancer cases has increased in the past ten years from 15% to more than 50%," he stated.

He called developments in research on chemical treatment of cancer "encouraging" and said this work is "being stepped up."

"Drugs and hormonal substances are gaining increasing value in the treatment of the leukemias and the more common cancers," Dr. Scheele reported. "Some lives are being prolonged and the patients are more comfortable."

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HORTICULTURE

Future Flower Festivals On Schedule Each Year

➤ SPRING FLOWER FESTIVALS may soon take place on schedule, even if the season has been unusually cold.

Experiments with controlling the time of budding by chemical methods have had wide success. However, such techniques have not yet been perfected enough for commercial use, according to Dr. Paul C. Marth, senior plant physiologist at the Department of Agriculture's experimental plant station, Beltsville, Md.

Horticulturists now can delay the fall of cherry blossoms by spraying them with a solution of naphthalene acetic acid when the first petals are out. The treatment keeps the blossoms on the trees one week longer than would be expected.

A naphthalene acetic acid solution is also used to delay the drop of fruit from trees at harvest time. On the other hand, if the chemical is sprayed on fruit trees earlier in the season, it will cause fruit to drop early.

Trees and plants of tomorrow may be made to bloom with a chemical called sodium thiocyanate. Although this product is not yet marketed for horticultural use, it has been successful in field experiments.

Scientists speculate that sodium thiocyanate affects a tree's enzyme system so that it converts stored material into material that can be more easily used for growth.

Attempts to delay budding have been less successful.

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CE FIELDS

ENGINEERING

Nation's First Mobile Gas Turbine Power Plant

➤ THE NATION'S FIRST mobile gas turbine power plant was described in Portland, Ore.

Designed by the U. S. Army, its development means that, in a time of emergency, towns and cities in the country can be supplied with temporary power quickly while the permanent power source is being repaired.

Mounted in two 54-foot-long railway cars, the gas turbine 5,000-kilowatt plant can be put into operation in five hours by a crew of ten men.

The use of the gas turbine as the prime mover offers several advantages over other types of power plants, Harry H. Rupp and William N. Hornberger of the Westinghouse Electric Corporation told the American Society of Mechanical Engineers meeting in Portland, Ore.

It is light and compact, can be put into service and loaded quickly, needs no water for cooling purposes, and provides good heat efficiency.

In certain areas, the Westinghouse engineers stated, this semi-permanent power plant introduces a new concept to power generation, since the power plant can be moved to the fuel source, rather than transporting the fuel to the power station.

The Army's new portable power plant is expected to find its widest use in cases of service interruption because of enemy attack, local disaster, flood, fire, drought in hydro power regions or under other emergency conditions.

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MEDICINE

See Bright Future for Live Polio Virus Vaccine

➤ THE DAY is coming when children will drink milk shakes or swallow capsules of live polio virus safely and get protection against the disease, in the opinion of seven researchers reporting in *Journal of the American Medical Association* (March 17).

Altogether 225 nonimmune persons have now swallowed doses of one or the other of two live but attenuated virus strains. All have developed antibodies against the viruses. None has gotten polio or suffered any ill-effects that could be laid to swallowing the viruses.

Most of the 225 were children. Two groups were in state institutions for mentally defective children. Permission to give the virus was obtained from each child's parents.

Health authorities have opposed use of live polio virus vaccines because of fear that the viruses living in the intestinal tract may spread the disease. This point was tested in some of the trials now reported. A set-up was arranged so that viruses could be spread from immunized to nonimmunized children. Only five of 15 got the viruses and then under "the most intimate of circumstances." None of the nurses became infected.

Capsules are considered the best way to give the live virus for vaccination. With these, the mouth and throat are by-passed, so that only the lower end of the digestive tract can be a source of contagion. Simple personal hygiene may completely prevent transmission of the viruses from this source.

The scientists reporting the trials are Dr. Hilary Koprowski, Thomas W. Norton and Mrs. Doris J. Nelsen of Lederle Laboratories, Pearl River, N. Y.; Dr. George A. Jervis of Letchworth Village, Thiells, N. Y., Dr. Thomas L. Nelson of Sonoma State Hospital, Eldridge, Calif., and Drs. David L. Chadwick and Karl F. Meyer of the University of California School of Medicine, San Francisco.

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PUBLIC SAFETY

A-Bomb Survivors Due To Lose Quarter of Life

➤ THOSE who "just" survive radiation injury from accidents or bomb explosions are due to lose about one-fourth of their normal life spans, according to findings on animals.

This premature aging or shortening of the life span is one of the permanent effects of radiation, Dr. Henry A. Blair, director of the Atomic Energy Project at the University of Rochester School of Medicine and Dentistry, Rochester, N. Y., reports.

The exposure limit recommended for personnel in atomic energy plants, three-tenths of a roentgen per week, would not, however, shorten life by more than 2.5% even in 20 years of maximum exposure, Dr. Blair said.

With an average life span for Americans of over 60 years, this would mean a shortening of approximately a year and a half.

This would be "very difficult to detect," Dr. Blair said, "and is probably not highly significant in view of other hazards to life."

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TECHNOLOGY

Device Warns Pilots To Lower Plane Wheels

➤ AN ANNOYING BUZZ will soon sound in the headgear of pilots coming in for landings. Its purpose is to remind pilots to lower their wheels.

The device, invented by John W. Teegarden of the Wright Air Development Center, will replace the currently used horn, difficult to hear.

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PSYCHOLOGY

Crime Increases But Sex Crimes Show Little Rise

➤ THE VOLUME OF CRIME has been steadily increasing but sex crimes have not increased significantly, Dr. Manfred S. Guttmacher, chief medical officer of the Baltimore, Md., Supreme Bench, reported at the meeting of the American Academy of General Practice in Washington.

Almost two-thirds of all arrests involve repeaters. Sex offenders, however, show a low rate of repeating, or recidivism. Serious sex crimes are not generally committed by persons previously convicted of a sex offense. They are more often committed by a person who has previously been guilty of burglary.

Every five minutes, someone is feloniously assaulted or killed, Dr. Guttmacher stated. He urged physicians to make every effort to prevent the development of defective personality structures.

Sex offenses do not all involve sex deviates, Dr. Guttmacher pointed out. Most homosexuals are not anti-social. Sex offenders, he added, do not graduate from minor to major sex offenses. Many are readily treatable.

Offenses that do not appear sexual often have a sexual basis.

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MEDICINE

Smear Gives Quick Skin Cancer Test

➤ A SKIN CANCER TEST that takes 15 minutes compared to as much as 48 hours for the conventional test has been devised by Dr. Frederick Urbach, Dr. Herbert Traenkle and Eugene M. Burke of the Roswell Park Memorial Institute, Buffalo, N. Y.

The test is an adaptation of the famous Papanicolaou smear technique now widely used for detecting cancer of the uterus.

A sample of tissue, removed from a suspicious area, is cut across the center and the cut surfaces rubbed on a glass slide. Cancer cells frequently will adhere to the slide and can readily be seen under a microscope. As cancer develops, the cells become less and less sticky. These loose cancer cells lend themselves to microscopic study.

The finding is of value in determining whether a very small lump or sore is malignant. Sometimes the lesion is too small for formal tissue study. A trained pathologist, however, can diagnose cancer if only a few cancer cells are smeared on a slide.

Of 140 tiny specimens examined by this technique only four were erroneously called benign. Of 360 benign tissues, only two incorrectly were called malignant. This compares favorably with the results of the conventional pathological examination called biopsy. The findings were announced by the American Cancer Society.

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ZOOLOGY

Survival of the Fewest

Thirty-eight species of North American wildlife face extinction. Man, who has been largely responsible for eliminating these rare animals, has the power to save them.

By HOWARD SIMONS

➤ THE LARGEST flesh-eating animal and the tallest bird in the United States face extinction.

Extinction is a very harsh word. It means the end of life. Not just the life of an individual, but the life of an entire species. It is particularly harsh today, when man seems most concerned with preserving his own species

However, at least 38 different species of wildlife on the continent are in peril of disappearing completely.

For the most part, man has been responsible for the dangerous plight facing these animals, birds and fishes. It is also, ironically, man who can save the few remaining individuals of these species and perhaps bring their numbers to a safe margin of survival.

This is both the warning and the plea made by conservationists.

Some of the endangered wildlife, such as the temperamental old grizzly bear, the largest flesh-eating animal in the United States, and the proud whooping crane, the tallest bird, the green turtle of soup fame and the American crocodile, are well-known.

Others, such as the Eskimo curlew and Attwater's prairie chicken, are less familiar.

Some Taken for Granted

Still others, such as the lake trout and the lake sturgeon, are so taken for granted by the public that suggestion of their possible extinction is almost as hard to swallow as their bones.

Nevertheless, conservationists emphatically state, "the day may soon be here, if we are not alert, when we will no longer enjoy the stately beauty of some of our finest animals."

These animals, all of which were once numerous on the continent, are the victim's of man's mismanagement of his natural resources and his greed.

Conservationists point to the destruction of the animals' homes through poisonous pollution of our waters, burning of the forests, overgrazing of the grasslands, careless draining of swamps and marshes, and wanton hunting with gun, trap and rod.

In combination, these factors have decimated many animal populations. Man has already destroyed some species.

He will never again see the Merriam elk, passenger pigeon, Labrador duck, Carolina paroquet, sea mink, great auk or heath hen.

Now others have been placed in a position where they, too, may soon be talked of only in the past tense.

Whooping cranes, subject of much publicity in recent years, now number 28. Dependent on only one wintering area in Texas, after a flight down the middle of the United States from Canada, these huge white birds have been fighting for survival for 40 years.

Less than 50 Everglade kites, once found throughout most of Florida, are left.

The Key deer, which stand only 22 to 26 inches high, now number 130 in their home in the Florida Keys.

The last surviving members of the largest land bird in the nation, the California condor, number 60. These birds, now restricted to the mountains of California, ranged as far eastward as Florida many thousands of years ago.

Attwater's prairie chicken has been reduced to less than 20 small colonies. As one conservationist states, since the Attwater's prairie chicken dies on the installment plan, another 15 years of grace is not anticipated.

Perhaps the saddest example of contemporary extinction or near-extinction of a species is the story of the ivory-billed woodpecker, largest woodpecker in North America. Originally inhabitants of the swamps of the Southeast, by 1926 the bird was believed extinct.

Although a few birds were spotted from time to time in the 40's and 50's, there have been no authentic reports of an ivory-billed woodpecker since 1952.

"The lake sturgeon of the Great Lakes," we are told, "is another candidate for the listing of extinct animals. Once of great importance to commercial fisheries, it has now reached the biological threshold where restoration efforts may do little good."

The lake trout, although abundant in most of its American habitat, is endangered in its Great Lakes home. In Lake Michigan, for instance, only eight lake trout were caught last year in more than 1,000 miles of gill net fishing that 20 years ago would have netted 50,000 fish.

These are but a few stark illustrations of how once abundant wildlife populations have been backed into a survival corner.

To those animals already mentioned must be added the Tule elk, the black-footed ferret, the sea otter, the kit fox, the woodland caribou, the gray wolf, the red wolf, the desert and Sierra bighorn sheep, the manatee and the Caribbean monk seal.

Their feathered companions of the continent who are facing extinction are the Mississippi, swallow-tailed and white-tailed kites, the roseate spoonbill, the Hudsonian godwit, the Florida sandhill crane, the Laysan teal, the nene, the Aleutian tern, the

GRIZZLY BEAR—You may have seen these fellows, if you have been to Yellowstone National Park in Wyoming. They are two of 125 grizzly bears that live and play in the Park. Grizzlies, however, are facing extinction, conservationists warn, as are 37 other species of North American wildlife.

Florida burrowing owl, the peregrine falcon, he red-bellied hawk, Kirtland's warbler and he Cape Sable seaside sparrow.

The Great Lakes whitefish, the American rocodile and the green turtle may be pass- ng away forever.

Conservationists are confident that with oncerted public and governmental action nany of these animals can be saved. Some, owever unfortunate, are beyond help.

The National Wildlife Federation has out- ned eight courses of action to help save he nation's endangered wildlife. They all for:

1. The promotion of coordinated research o determine the best restoration methods.
2. The enforcement of Federal and state ws of protection.
3. Halting deliberate and accidental aughter of endangered wildlife.
4. Establishment of comprehensive use olicies at the national, state and local vels for protection dependent on develop- ent of other natural resources.
5. The initiation of more public educa- on campaigns.
6. The protection from encroachment of tablished state, Federal and private sanc- aries, forests, parks and refuges.
7. Effective pollution control.
8. Support for the International Union r the Protection of Nature in Brussels, elgium.

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EDICINE

Devise New Drugs for Blood Pressure, Ulcers

A NEW GROUP of drugs that lower lood pressure and might also prove useful treating stomach ulcers has been de- loped by scientists at the Wellcome Re- arch Laboratories, Beckenham, Kent, Eng- nd.

When tried on patients, the drug called 56C54 has been one of the most promising far. Injected under the skin, it has sually lowered the blood pressure for seven 12 hours. Unpleasant side effects have en at a minimum, except for some vari- le and often temporary disturbance of sion because the drug may dilate the pupil the eye. This can be partly counteracted eye drops.

Use of the drugs in stomach ulcer pa- nts is suggested because of their great ility to block secretion of stomach juices d stomach activity.

The drugs act by blocking nerve centers, lled ganglia. They belong to the chemical ss of diquaternary-amino-carbinols. Some e related to antihistamines, others to pain- llers.

News of them comes from an announce- ent in *Nature* (March 17) by a Wellcome search Laboratories team consisting of rs. D. W. Adamson, J. W. Billinghurst d A. F. Green. Dr. S. Locket of Old- urch Hospital, Romford, Essex, tried the ugs on patients.

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ASTRONOMY

Jupiter's Radio Static

➤ JUPITER'S "pops and swishes" are being tuned in on by radio astronomers who find the planet's red spot is often present when the "static" is heard.

Five astronomers from three observatories told the American Astronomical Society meeting in Columbus, Ohio, of new findings on radio waves from Jupiter, the first planet in the solar system from which radio waves were detected. (See SNL, Feb. 18, p. 110.)

Jupiter's red spot, first noted in 1878, is a semi-permanent marking that seems to float in the atmosphere, not being rooted to the surface. One source of radio noise from Jupiter seems to rotate at about the same rate as the red spot, Drs. Bernard F. Burke and Kenneth L. Franklin of Carnegie Institution of Washington reported.

The planet revolves on its axis about every ten hours, but the noise is not found every time the spot appears. That a correlation exists between the two has been confirmed by Austrian radio astronomers.

Radio waves from Jupiter at 22 megacycles are almost 100% polarized, the Carnegie scientists reported.

Two scientists from the National Bureau of Standards laboratory at Boulder, Colo., said they had found that bursts of radio-activity heard at one frequency are not necessarily heard at another.

Drs. Roger M. Gallet and Kenneth L. Bowles reported that the Central Radio Propagation Laboratory at Boulder was set up to receive radio waves from Jupiter at two different frequencies at the same time.

Dr. John D. Kraus of Ohio State University said he and his associates had been tracking Jupiter since January at a wavelength of 33 feet. The planet's broadcasts resemble popping sounds following each other at intervals of fractions of seconds.

Dr. C. A. Shain of Australia's Radiophysics Laboratory found an active region had been observed on Jupiter in 1950 but it was not then recognized as such and is not as active now as it was then, Dr. Franklin reported.

Until a better explanation is found, scientists consider the radio noise is caused by large-scale disturbances in Jupiter's atmosphere, resembling thunderstorms on earth.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ANESTHESIA: Thief of Pain—Sylvan M. Shane with introduction by Henry E. Sigerist—*Vantage*, 87 p., illus., $2.50. Telling how an operation or childbirth can be made relatively painless.

BOSTON PUBLIC LIBRARY: A Centennial History—Walter Muir Whitehill—*Harvard University Press*, 274 p., illus., $4.75. The history of a famous institution that first opened its doors to readers in 1854.

CHEMISTRY IN ACTION—George M. Rawlins and Alden H. Struble—*Heath*, 3d ed., 591 p., illus., $4.40. New edition of a successful high school text.

EFFECTS OF TRAFFIC CONTROL ON STREET CAPACITY—Oscar Sutermeister and others—*Highway Research Board*, 52 p., illus., paper, 90 cents. The effect of variously timed traffic lights, stop signs, and a parked car on the traffic flow.

EINSTEIN: A Pictorial Biography — William Cahn—*Citadel Press*, 127 p., illus., paper, $1.50. A volume of beautiful photographs.

GENETICS IN THE ATOMIC AGE—Charlotte Auerbach—*Essential Books*, 106 p., illus., $2.00. Attempting to describe in non-technical language for the layman the branch of genetics dealing with mutation and its connection with radiation and nuclear fission.

FREE OFFERS 1955—Philip J. Kipust—*Free Offers Service*, 28 p., paper, $1.00. Where teachers and others can send for educational material and advertising material at no cost.

GRAPHIC SURVEY OF PHYSICS — Alexander Taffel—*Oxford Book Company*, 400 p., illus., paper, $1.35. This little book is an outgrowth of the author's "Visualized Physics," and attempts to help the student master quickly and economically the fundamental principles and skills of physics as covered in a high-school course.

THE HARVEY LECTURES DELIVERED UNDER THE AUSPICES OF THE HARVEY SOCIETY OF NEW YORK 1954-1955—Vincent du Vigneaud and others—*Academic*, 421 p., illus., $8.00. Publication of a series of ten of these famous lectures.

I AM A MATHEMATICIAN: The Later Life of a *University Press*, 64 p., illus., $2.75 More numer-Prodigy—Norbert Wiener—*Doubleday*, 380 p., $5.00. A mathematician tells of the development of ideas that led to a new science, cybernetics, and the transition from infant prodigy to scientific leader.

LIFE IN FRESH WATER—E. S. Brown—*Oxford* ous than the familiar fish, frogs and tadpoles are the more lowly creatures, such insects as the water-boatman and water beetles, water fleas and tiny mollusks.

THE MASTER DIVER AND UNDERWATER SPORTSMAN—T. A. Hampton—*Adlard Coles (John de Graff)*, 208 p., illus., $5.00. A diving manual giving instruction in diving, protective clothing, underwater cutting and welding, blasting and seamanship.

THE NAVAJOS—Ruth M. Underhill—*University of Oklahoma Press*, 299 p., illus., $4.50. The story of America's largest Indian tribe by an anthropologist of the University of Denver.

OBSERVATIONAL ASTRONOMY FOR AMATEURS—J. B. Sidgwick—*Faber and Faber (Macmillan)*, 358 p., illus., $10.00. A companion volume to the author's "Amateur Astronomer's Handbook." The handbook is devoted to the instrumental and theoretical background of practical astronomy; this work describes observation techniques.

POSSIBILITIES OF ACTION IN THE FIELD OF NUCLEAR ENERGY—Working Party on Nuclear Energy—*Organization for European Economic Cooperation*, 70 p., illus., paper, $1.00. Discussing the need for and possibility of use of nuclear energy for peaceful power.

PROCEEDINGS OF THE UNDERWATER PHYSIOLOGY SYMPOSIUM — Loyal G. Goff, Ed. — *National Academy of Sciences-National Research Council*, 153 p., illus., paper, $1.50. The range of topics covered includes oxygen toxicity, decompression and bends, and respiratory problems.

STEELS FOR THE USER—R. T. Rolfe—*Philosophical Library*, 3d ed., rev., 399 p., illus., $10.00. Written by a consumer for the practical man who must make use of steel.

STUDIES OF THE PSYCHOLOGY AND BEHAVIOR OF CAPTIVE ANIMALS IN ZOOS AND CIRCUSES—H. Hediger—*Criterion*, 166 p., illus., $6.50. By the director of the Zurich zoo and professor of animal psychology at the University of Zurich.

THE TRUTH ABOUT CANCER — Charles S. Cameron—*Prentice-Hall*, 268 p., illus., $4.95. An attempt to save the lives of some 80,000 people each year by making known the nature, causes and treatments of cancer and telling how to spot it in its earliest stages.

SECRETS OF SPACE FLIGHT—Lloyd Mallan—*Arco*, 144 p., illus., $2.00. Profusely illustrated.

TYPE SPECIES OF THE GENERA AND SUBGENERA OF PARASITIC WASPS COMPRISING THE SUPERFAMILY PROCTOTRUPOIDEA (ORDER HYMENOPTERA)—C. F. W. Muesebeck and Luella M. Walkley—*Smithsonian*, Proceedings, U.S. National Museum, Vol. 105, No. 3359, 101 p., paper, free upon request direct to publisher, Washington 25, D. C.

THE WONDERFUL WORLD OF THE SEASHORE—Albro Gaul—*Appleton-Century-Crofts*, 247 p., illus., $5.00. If you know something of the birds, plants and animals of the sea's edge, the author explains, your vacation days can become richer and more enjoyable.

THE WONDERS OF SEEDS—Alfred Stefferud—*Harcourt, Brace*, 119 p., illus., $2.75. An editor for the U. S. Department of Agriculture tells in simple language how long and under what conditions seeds can be kept alive, and what will make them sprout and grow.

THE WORLD OF ATOMS: An Introduction to Physical Science—J. G. McCue and Kenneth W. Sherk—*Ronald*, 659 p., illus., $6.50. A beginning college text presenting atomic science as uniting physics and chemistry.

YOU AND YOUR SENSES—Leo Schneider—*Harcourt, Brace*, 137 p., illus., $2.75. A book for young people telling how you see, hear and use your other senses.

Science News Letter, March 31, 1956

ENGINEERING

Engineers Take "Pulse" Of Empire State Building

➤ ENGINEERS have taken the Empire State Building's "pulse," the imperceptible vibrations caused chiefly by winds, and found it normal.

To conduct the experiment, aeronautical engineers from Minneapolis-Honeywell installed a very precise gyroscope near the center of the Empire State's 85th floor.

Electronic measurements, telemetered to a recorder ten miles away, showed the building had a natural vibration, or "pulse," of between seven and eight times a minute.

Other buildings in New York tested for comparison recorded vibrations of 50 times per minute and higher.

Although the tests were not made to measure sway, they gave a clue to the building's minute shifts. The Empire State was never off center more than about one-quarter of an inch, the Minneapolis-Honeywell engineers found.

No building yet constructed, they point out, is perfectly rigid, and the Empire State comes close to maximum stability. The 365,000-ton, 102-story skyscraper is basically composed of an elastic steel frame, giving it the ability to yield before heavy winds, yet minimizing their effect.

The measuring element was a gyro known as a hig gyro, or hermetic integrating gyro, developed by Minneapolis-Honeywell in collaboration with Massachusetts Institute of Technology for use in Air Force automatic fire control systems for supersonic and pilotless aircraft.

The instrument is hundreds of times more sensitive than conventional gyros. It can detect motion 3,000 times slower than the movement of the hour hand on a watch.

Science News Letter, March 31, 1956

EDUCATION

Substandard Teachers

➤ MORE THAN 77,500 full-time school teachers in the United States and its possessions have substandard credentials.

This figure represents 6.8% of the total public elementary and secondary school teaching force.

The statistics are revealed in a study by the U. S. Department of Health, Education and Welfare on enrollment, teachers and school housing in the fall of 1955, in full-time public day schools.

The magnitude of the figures, the Department states, must be considered in the light of the fact that the definition of "substandard" varies from state to state. In the survey, the state departments of education listed as substandard all those teachers who did not meet the minimum requirements set up by the individual state for teaching.

Several states report no teachers with substandard credentials.

Arkansas, on the other hand, reports that 30% of its full-time teachers are instructing with substandard credentials.

The survey also showed that 30 states require a bachelor's degree for teaching elementary students, and 42 states require a bachelor's degree for high school teaching.

"The shortage of qualified teachers and the lack of adequate school housing are among the most persistent educational problems now confronting the nation," Herbert S. Conrad, director of the U. S. Office of Education's research and statistical services branch, states.

Last year, he points out, the number of qualified teachers increased at a more rapid rate than the number of pupils who enrolled. At the same time, fewer pupils in excess of normal capacity for the country's school systems were enrolled.

Despite these facts, he reports, the backlog of need is so great that the nation's educational system still essentially needs "continued and greater improvement."

The number of classrooms (67,098) scheduled to be built during the current fiscal year, Mr. Conrad states, "is more than sufficient to take care of the year's prospective increase in enrollment."

In the fall of 1955, the survey shows, 22,059,688 students were enrolled in elementary schools, 8,472,478 in secondary schools; there were 1,135,093 teachers.

Science News Letter, March 31, 1956

BIOCHEMISTRY

Mechanism X for Color

➤ A MYSTERIOUS something called "Mechanism X" that apparently plays a part in giving skin its color has been discovered by Dr. Morris Foster of Yale University.

Cancer, gray hair, and certain diseases in which the skin is splotched with white or unsightly colors are problems on which the discovery may have a bearing.

Dr. Foster's mechanism X is found in normal skin. Working with mice, Dr. Foster found that when he places in a solution a piece of albino skin, a piece of normal skin and a chemical called tyrosine, which is the raw material from which pigment is made, the albino skin soon begins to take on the color of normal skin.

Something in normal skin, mechanism X, transforms the tyrosine into pigment which colors the albino skin.

Mechanism X is a relatively simple and subtle substance capable of penetrating through extremely small pores. Dr. Foster has put normal skin and tyrosine in a cellophane bag and placed the bag and the albino skin in a solution. Mechanism X was able to diffuse through the pores of the bag and color the albino skin.

This indicated that mechanism X is a rather small molecule, much smaller and simpler than an enzyme or other protein particle, which albino skin cannot make.

The connection between Dr. Foster's findings and cancer is pointed out by the American Cancer Society, which supports his research, as follows:

The ability of certain cells to produce pigment represents a degree of specialization. Cancer cells are characterized by their lack of specialization even more than by their constant growth. One of the more lethal types of cancer, melanoma or black cancer, is due to the overgrowth of pigment-producing cells.

Science News Letter, March 31, 1956

ENGINEERING

Foresee Control of Cars To Handle Traffic Snarl

➤ CITIES may give up trying to control traffic by lights and other conventional means, turning instead to directing individual automobiles as traffic congestion mounts in future years.

This was suggested by a team of University of Michigan engineers in a report to the Highway Research Board of the National Research Council-National Academy of Sciences meeting in Washington.

Such traffic directing of cars may be done, for example, by directly controlling the movement of each car, or by a broadcast that informs every driver of traffic conditions for blocks around him. Broadcasting might be done by cathode tube displays, Harry H. Goode, Carl H. Pollmar and Jesse B. Wright reported.

Before this happens, engineers expect use of electronic "brains" in all major cities to solve complex traffic snarls. Each large city would have its own digital computer and team of operators in this scheme. Smaller communities might band together, perhaps under state auspices, to use a single large computer.

One of the chief advantages of having an electronic "brain" work out the best patterns of traffic control, besides giving the speediest answer, is that experiments can be performed using mathematical models, and the best traffic changes can be decided on without having to disrupt actual traffic flow as in usual trial and error method.

"The worst aspect of our lack of knowledge of the traffic process today" is lack of a way to get a reasonable estimate of the maximum benefits from traffic control measures, the engineers said.

Thus, we do not know whether to invest money in simple control methods or to try out more radical schemes like moving of sidewalks or even city dispersal.

Use of digital computers should furnish a means for gathering this kind of information, useful now and in the future.

Science News Letter, March 31, 1956

ORNITHOLOGY

NATURE RAMBLINGS

by Horace Loftin

The Eagle's Tribute

➤ THE GREAT BALD EAGLES of Saint Marks Wildlife Refuge are finding life a lot easier since spring has come to their home in this almost primeval wilderness tract in north Florida.

Only a few weeks ago, the bald eagles had to depend on their own prowess to secure a meal, hovering patiently in the air until they could swoop upon an unwary coot or catch a fish swimming close to the surface.

With the return of spring to northern Florida, early February down there, lesser birds of prey, the fierce-looking ospreys, suddenly appeared in the refuge to take over their old nests and feeding grounds.

The return of the ospreys means both easy meals and fun for the bald eagles.

An osprey depends on catching fish for the greater part of his food, and he is an industrious hunter. But after he has caught a plump mullet in his talons and starts to fly home with it, his victory may be short-lived. If his success in fishing is observed by a hungry bald eagle, he is apt to have to give the fish in tribute to his great cousin.

For the bald eagle delights in attacking the osprey, flying at him, worrying him, intimidating him until he loosens his iron grip on the fish and it falls from his claws. Thereupon, the eagle scoops up this easily won meal and flies away with it to dine at leisure from atop his favorite dead tree.

While not a very "noble" act for this "noble" bird, the bald eagle, with his superior size, seems untroubled by remorse over this meal taken from his hard-working but smaller relative.

In spite of harassment from the bald eagles, however, the ospreys are a thriving race in the swamps of Saint Marks. Their sleek forms can be seen darting and circling over the marshland in large numbers, and their short, sharp, cheeping whistles—a surprisingly mild "chewk chewk chewk" for such a large, striking bird—seem to be the predominant voice of the wilderness.

Perched on a high, dead tree near his great nest of twigs and Spanish moss, an occasional osprey can be seen fiercely tearing at a fish in his talons, one the bald eagles did not get.

Even then, however, a fish crow will probably be waiting on the limb, at a respectful distance, ready to eat the crumbs of the osprey's feast.

Science News Letter, March 31, 1956

See Cosmic, Alpha, Beta Rays

BIOCHEMISTRY

Blood Defect Discovered

➤ UNKNOWN NUMBERS of babies will be saved from death or blindness and imbecility by a discovery of scientists at the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md.

The life-saving discovery is that the babies inherit a blood defect that makes them unable to handle part of the sugar in milk. This can cause blindness, severe mental defect or even death, Dr. Floyd S. Daft, the institute's director, reported at hearings held recently by a House appropriations subcommittee.

As a result of the discovery, doctors will be able to detect the condition and take the babies off milk in time to save them.

How many babies suffer from this defect is not known. The disease has been known for some time, but has been considered rare. It may, however, have been more widespread than doctors realized, because many infant deaths and cases of blindness and imbecility of no known cause may have been due to this condition.

A few days after birth a baby with this disorder becomes extremely ill, gets diarrhea, loses its appetite, loses weight, and is jaundiced.

The name of the disease is galactosemia, meaning the presence of galactose in the blood. Galactose is one of the two sugars that make up lactose, or milk sugar. The other half of lactose is glucose, the usual sugar in blood.

Galactose cannot be used by the body b must be turned into glucose. An enzyr in normal red blood cells converts galacto into glucose, the arthritis institute scienti have now discovered.

Some babies, however, lack this enzyr in their red blood cells. They cannot co vert galactose to glucose. They are the or who die, or if they survive, develop blindi cataracts and imbecility from the galacto in their blood.

A simplified test for galactosemia that c be made in any well-equipped hospital now being developed by scientists at t institute.

Science News Letter, March 31, 19

HORTICULTURE

Lawn Seed Mixtures Found Inadequate

➤ IN PLANTING a lawn this spring, b particular about the seed mixture.

This advice came from Dr. B. E. Clarl head of the department of seed invest gations at the Cornell University Experimer Station, Geneva, N. Y., after he made survey of 108 different lawn seeding mi tures being sold currently.

Most mixtures were found to be d ficient in Kentucky bluegrass and fescue According to the Cornell Extension specia ists, a lawn seeding mixture for use in sunny spot should have at least 55% Ke tucky bluegrass of either the common Merion varieties. Only five percent of th 108 brands analyzed contained the recon mended amount. The average for all th brands was 14%.

A good lawn mixture should also incluc red fescues, rough bluegrass and coloni bentgrass. These, with the Kentucky blu grass, should constitute 80% of the mixtur the agronomists state. Of the brands e amined only 16% contained the desire amount.

Contents of lawn seeding mixtures a listed on the package.

Science News Letter, March 31, 19

METEOROLOGY

2,000-Day Pattern

➤ INVISIBLE WEATHER PATTERNS tend to repeat themselves every 2,000 days, dishpan tests by Dr. Dave Fultz of the University of Chicago indicate.

Colored dyes and aluminum powder swirling in the dishpan helped to show the world's weather may complete a cycle every five or six years. It is well known there are shorter periods numbered in days instead of years.

Discovery of the five-year cycle definitely does not mean that one day's weather can be predicted by looking at weather maps for that day five years before. What repeats is not specific weather, rain or sunshine or snow, nor even the visible patterns of the miniature atmosphere Dr. Fultz makes in a dishpan.

What does repeat is the mathematically computed but invisible transfer of heat. The 2,000-day patterns is superimposed on a 12-day pattern visible in the rotating dishpan.

This laboratory model of the atmosphere can be heated or cooled either from the outside, which represents the equator, or from the center, which represents the North Pole. As the dishpan rotates on a phonograph-like turntable, dyes coloring the water and aluminum powder sprinkled on its surface allow scientists to watch the large-scale currents and eddies of atmospheric flow.

It is something like it would be to watch the daily weather map in a newspaper in motion. It is more like viewing, in a few minutes, a motion picture of the Weather Bureau's charts of the upper atmosphere after they had been filmed for a year.

The dishpan patterns duplicate on a small scale the so-called planetary wave, a world-circling band of air 30,000 to 40,000 feet above the earth's surface, flowing from west to east about half-way between the North Pole and the equator.

The 2,000-day pattern Dr. Fultz discovered in his dishpan model would be difficult to locate in the real atmosphere, because so many other factors affect weather it would almost certainly be hidden.

Science News Letter, March 31, 1956

MEDICINE

New Cancer Hope

➤ FIVE PATIENTS, all now dead of cancer, have given doctors and surgeons new hope of saving future victims.

The five originally had lung cancer of a kind that could not be operated on when they were first seen. Examination of their bodies after they died, however, showed no sign of cancer in their chests. The new treatment method had licked the original, inoperable cancers.

The patients lived from eight months to one year after the treatment. They died of cancer that had spread to their brains. If they had been treated earlier, they might have been cured.

The new treatment for inoperable lung cancer consisted in giving big doses of X-rays from a two-million-volt X-ray machine before operation. This destroyed enough of the cancer so the surgeons could open the chests and remove the rest.

These five cases were reported by Drs. Herbert D. Adams, David P. Boyd, C. R. Souders and Stewart H. Jones of the Lahey Clinic, Boston, at the meeting of the American Academy of General Practice in Washington.

While hoping the new method will save more lung cancer victims, the Boston doctors stress the importance of early chest exploration to prevent patients getting to the late, inoperable stage of lung cancer.

"The only way early diagnosis will be made is to open the chest and look inside," Dr. Jones said.

X-ray pictures and symptoms are not good enough for detecting all lung cancers in the early stages, he said. Too often the X-ray picture will show a little shadow that might or might not be lung cancer.

If the patient and his doctor wait three months or so to see whether the shadow grows, they may miss the chance of getting it out while it is still small and has not seeded itself to other parts of the body.

The operation of opening the chest to make sure is in itself safe and almost painless, by modern methods. The patient can go home from the hospital in a week if the operation shows no cancer.

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Questions

BIOCHEMISTRY—What new mother-baby relationship has been discovered? p. 197.

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GEOPHYSICS—What is the only function of the third stage of vehicle lifting the satellite into its orbit? p. 195.

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PUBLIC HEALTH—What is present cancer cure rate? p. 200.

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SOCIOLOGY—How has Soviet science changed since Stalin's death? p. 198.

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PHOTOGRAPHS: Cover, British Information Services; p. 195, Martin; p. 197, Frank White; p. 199, Fremont Davis; p. 202, E. P. Haddon—Fish and Wildlife Service; p. 208, Bakelite Company.

ELECTRONICS

Electronic Devices Find Cancer Cells and Tumors

➤ CANCER CELLS can be sorted from normal cells by an electronic scanning and computing device.

The device, known as the cytoanalyzer, scans the microscope image of the cells, automatically sorts them according to their characteristics and then classifies them as normal or suspicious.

It can collect and record more cell measurements in a matter of minutes than a technician could in as many months using present manual methods, W. E. Tolles, H. S. Sawyer and R. C. Bostrom of Airborne Instruments Laboratory, the cytoanalyzer's developer, told a meeting of the Institute of Radio Engineers in New York.

Another scanning device to help in locating brain tumors was described by S. Arnow and G. L. Brownell of Massachusetts General Hospital.

An electronic instrument detects the amount of radiation given off by radioactive tracers introduced into the brain. The information is then automatically converted into a picture of the tumor location, showing increased concentration of tracer material where there are abnormalities.

Science News Letter, March 31, 1956

· New Machines and Gadgets ·

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 824. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

DEMONSTRATION KITS for the classroom show water conservation methods and water pumps. Two available kits let the student build and operate a conservation project tray and water project pumps. The kits are complete with the necessary equipment and manuals of instruction.

Science News Letter, March 31, 1956

WINDOW WALL is described as the largest horizontal sliding window wall ever designed. Made primarily for apartments, hospitals, office buildings and other large commercial structures, the partition-to-partition aluminum window is made in heights up to five and one-half feet and widths as desired.

Science News Letter, March 31, 1956

MOTORIZED SPIT for summer barbecues is entirely portable. It can be fitted to any type grill, brazier or fireplace. Capable of holding 20 pounds of fish, fowl or meat, the spit requires no plugs or cords, operating off four standard flashlight batteries. The barbecue aid weighs four pounds.

Science News Letter, March 31, 1956

LAMP SHADES that look like stained glass windows are reproductions of famous

American church windows, as shown in the photograph. Made of vinyl plastic by a special ten-color process, the shades are available in different sizes for table, television or pin-up lamps. They are scratch- and tear-resistant.

Science News Letter, March 31, 1956

DESK DUPLICATOR writes names or addresses or any repetitive data up to 13 lines and three inches long. Operating from a master typewritten form which can be filed for future use, the duplicating machine works by the same rotary printing action as conventional liquid duplicators.

Science News Letter, March 31, 1956

TWINKLE LAMP provides firefly-like lighting effect for indoor or outdoor parties. The scintillating colored lighting is emitted from a self-flashing lamp the size of the smallest Christmas bulb. Available in red, yellow, green and blue, the bulb is designed for use in transformer-operated string sets.

Science News Letter, March 31, 1956

MAGNETIC LEVEL for the amateur or professional craftsman will hold securely on ferrous metals at any angle on either flat or curved surfaces. With built-in permanent magnets, the aluminum level weighs ten ounces and has a plastic dial for reading.

Science News Letter, March 31, 1956

ROLLER SKATE specifically designed for the toddler is a non-ball bearing type with rubber wheels mounted directly on the axle. It has no key to lose or toe clamps to tighten. The skate also has red ankle straps.

Science News Letter, March 31, 1956

Do You Know?

Egg production is highest from *hens* kept at about 55 degrees Fahrenheit and 70% relative humidity.

The Arctic Ocean is slightly less salty than other *oceans.*

Virtually all modern *dyes* and pigments are synthetic, many of them prepared from coal tar.

A French electric *locomotive* broke the world's record for rail travel last year with a speed of 205 miles per hour.

Suet is the most universally accepted food offered wild birds at feeding stations.

In the 16th century, the *rod* was decreed to be the total length of the left feet of the first 16 good men and true who emerged from church on Sunday morning.

Pelicans are almost voiceless.

Mosquitoes are the principal carriers of equine sleeping sickness.